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09/806,220	05/14/2001	Roger Sandstrom	98003-UTAP	4894

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EXAMINER	
GAY, JENNIFER HAWKINS	
ART UNIT	PAPER NUMBER
3672	

DATE MAILED: 07/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/806,220	SANDSTROM, ROGER
	Examiner	Art Unit
	Jennifer H Gay	3672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *15* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over DE 1170887 in view of Jansson et al. (US 4,760,887).

DE 1170887 discloses a threaded connector for a percussion drilling assembly. The connector includes the following features:

- A male thread (3a and 3b) located on a first drill string element (3).
- A female thread located on a second drill string element (1 and 2).
- The first and second drill string elements each include respective impact surfaces (shown in the Figure) that are arranged to abut each other.

DE 1170887 discloses all of the limitations of the above claims except for the threads being characterized in that they have a crests having a radius of curvature that is greater than 30% of the pitch of the threads.

In column 2, lines 10-20 and column 3, lines 25-43, Jansson et al. teaches a threaded connector for a percussion drilling assembly with threads are characterized in that they have crests having a radius of curvature that is greater than 30% of the pitch of the threads; specifically 43.3%.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the threads of DE 1170887 so that they are characterized in that they had crests having a radius of curvature that was greater than 30% of the pitch of the threads as taught by Jansson et al. in order to have achieved a threaded coupling that has a long life span and good unscrewing characteristics (see col. 3, lines 17-19).

3. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE 1170887 in view of Jansson et al. (US 4,760,887) as applied to claim 1 above, and further in view of Yao (US 6,196,598).

DE 1170887 and Jansson et al. disclose all of the limitations of the above claims except for the angle of the cone formed by the male and female threads being less than 20°, specifically 3°. Yao teaches a threaded coupling for a drill string used in rotary or percussive drilling. The threads of the coupling are conical in shape and have a cone angle of between 3° and 10°. (See col. 4, lines 13-29) It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the cone formed by the male and female threads of DE 1170887 in view of Jansson et al. with an angle less than 20°, specifically 3° as taught by Yao in order to have ensured optimum stress mitigation (see col. 4, lines 25-29)

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jansson et al. (US 4,760,887) in view of Saunders et al. (US 4,549,754) and Puttmann (US 5,924,500).

Jansson et al. discloses a threaded connector for a percussion drilling assembly. The connector includes the following features:

- A male thread (15) located on a first drill string element (10 and 11).
- A female thread (13) located on a second drill string element (12).
- The first and second drill string elements each include respective impact surfaces (16 and 18) that are arranged to abut each other.
- The threads are characterized in that they have a crests having a radius of curvature that is greater than 30% of the pitch of the threads (43.3%, see col. 2, lines 10-20 and col. 3, lines 25-43).

Jansson et al. discloses all of the limitations of the above claims except for a conical or tapered thread.

As seen in Figures 11 and 14, Saunders et al. teaches a threaded tool joint for a rotary oil well tool that has a tapered thread.

In column 1, lines 11-17, Puttmann (US 5,924,500) teaches drill rods used in rotary or rotary/percussion drilling therefore teaching that drill rods are interchangeable between rotary and percussion drilling operations.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have tapered the thread of Jansson et al. as taught by Saunders et al. and Puttmann in order to have provided a tool joint for rotary or percussion drilling that resulted in lower local stresses and reduced the susceptibility to fatigue failure (see col. 1, lines 63-66 of Saunders et al.).

5. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jansson et al. (US 4,760,887) in view of Saunders et al. (US 4,549,754) and Puttmann (US 5,924,500) as applied to claim 1 above, and further in view of Yao (US 6,196,598).

Jansson et al., Saunders et al., and Puttmann disclose all of the limitations of the above claims except for the angle of the cone formed by the male and female threads being less than 20°, specifically 3°. Yao teaches a threaded coupling for a drill string used in rotary or percussive drilling. The threads of the coupling are conical in shape and have a cone angle of between 3° and 10°. (See col. 4, lines 13-29) It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the cone formed by the male and female threads of Jansson et al. in view of Saunders et al., and Puttmann with an angle less than 20°, specifically 3° as taught by Yao in order to have ensured optimum stress mitigation (see col. 4, lines 25-29)

6. Alternately, claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jansson et al. (US 4,760,887) in view of Saunders et al. (US 4,549,754), Puttmann (US 5,924,500), and Eklof et al. (US 4,687,368).

Jansson et al. discloses a threaded connector for a percussion drilling assembly. The connector includes the following features:

- A male thread (15) located on a first drill string element (10 and 11).
- A female thread (13) located on a second drill string element (12).
- The first and second drill string elements each include respective impact surfaces (16 and 18) that are arranged to abut each other.

- The threads are characterized in that they have a crests having a radius of curvature that is greater than 30% of the pitch of the threads (43.3%, see col. 2, lines 10-20 and col. 3, lines 25-43).

Jansson et al. discloses all of the limitations of the above claims except for the threaded connector having a conical or tapered thread and except for the first and second drill string elements including impact surfaces that are arranged to abut each other.

As seen in Figures 11 and 14, Saunders et al. teaches a threaded tool joint for a rotary oil well tool that has a tapered thread.

In column 1, lines 11-17, Puttmann (US 5,924,500) teaches drill rods used in rotary or rotary/percussion drilling therefore teaching that drill rods are interchangeable between rotary and percussion drilling operations.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have tapered the thread of Jansson et al. as taught by Saunders et al. and Puttmann in order to have provided a tool joint for rotary or percussion drilling that resulted in lower local stresses and reduced the susceptibility to fatigue failure (see col. 1, lines 63-66 of Saunders et al.).

As seen in Figure 1 and 3, Eklof et al. teaches a threaded connection for a percussion rock drill. The threaded connection includes conical male threads (13) located on a first drill string element (10) and conical female threads (12) located on a second drill string element (11). The first element includes a first impact surface (16) and the second element includes a second impact surface (15). It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have included the first and second impact surfaces taught by Eklof et al. on the threaded connector of Jansson et al. in order to have provided a means for limiting the degree to which the two elements were threaded together, i.e. to have ensured that the threads of the two elements were completely in contact.

7. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jansson et al. (US 4,760,887) in view of Saunders et al. (US 4,549,754), Puttmann (US 5,924,500), and Eklof et al. (US 4,687,368) as applied to claim 1 above, and further in view of Yao (US 6,196,598).

Jansson et al., Saunders et al., Puttmann, and Eklof et al. disclose all of the limitations of the above claims except for the angle of the cone formed by the male and female threads being less than 20°, specifically 3°. Yao teaches a threaded coupling for a drill string used in rotary or percussive drilling. The threads of the coupling are conical in shape and have a cone angle of between 3° and 10°. (See col. 4, lines 13-29) It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the cone formed by the male and female threads of Jansson et al. in view of Saunders et al., Puttmann, and Eklof et al. with an angle less than 20°, specifically 3° as taught by Yao in order to have ensured optimum stress mitigation (see col. 4, lines 25-29)

8. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Larsson (US 4,861,209) in view of Saunders et al. (US 4,549,754) and Puttmann (US 5,924,500).

Larsson discloses a threaded connector for a percussion drilling assembly. The connector includes the following features:

- A male thread located on a first drill string element (see Abstract).
- A female thread located on a second drill string element (see Abstract).
- The first and second drill string elements each include respective impact surfaces (see Abstract and col. 2, line 58-col. 3, line 16).
- The threads are characterized in that they have a crests having a radius of curvature that is greater than 30% of the pitch of the threads (37.7%, see col. 3, lines 17-23).

As seen in Figures 11 and 14, Saunders et al. teaches a threaded tool joint for a rotary oil well tool that has a tapered thread.

In column 1, lines 11-17, Puttmann (US 5,924,500) teaches drill rods used in rotary or rotary/percussion drilling therefore teaching that drill rods are interchangeable between rotary and percussion drilling operations.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have tapered the thread of Jansson et al. as taught by Saunders et al. and Puttmann in order to have provided a tool joint for rotary or percussion drilling that resulted in

lower local stresses and reduced the susceptibility to fatigue failure (see col. 1, lines 63-66 of Saunders et al.).

9. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larsson (US 4,861,209) in view of Saunders et al. (US 4,549,754) and Puttmann (US 5,924,500) as applied to claim 1 above, and further in view of Yao (US 6,196,598).

Larsson, Saunders et al., and Puttmann disclose all of the limitations of the above claims except for the angle of the cone formed by the male and female threads being less than 20°, specifically 3°. Yao teaches a threaded coupling for a drill string used in rotary or percussive drilling. The threads of the coupling are conical in shape and have a cone angle of between 3° and 10°. (See col. 4, lines 13-29) It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the cone formed by the male and female threads of Larsson in view of Saunders et al., and Puttmann with an angle less than 20°, specifically 3° as taught by Yao in order to have ensured optimum stress mitigation (see col. 4, lines 25-29)

10. Alternately, claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Larsson (US 4,861,209) in view of Saunders et al. (US 4,549,754), Puttmann (US 5,924,500), and Eklof et al. (US 4,687,368).

Larsson discloses a threaded connector for a percussion drilling assembly. The connector includes the following features:

- A male thread located on a first drill string element (see Abstract).
- A female thread located on a second drill string element (see Abstract).
- The first and second drill string elements each include respective impact surfaces (see Abstract and col. 2, line 58-col. 3, line 16).
- The threads are characterized in that they have a crests having a radius of curvature that is greater than 30% of the pitch of the threads (37.7%, see col. 3, lines 17-23).

Larsson discloses all of the limitations of the above claims except for the threaded connector having a conical or tapered thread and except for the first and second drill string elements including impact surfaces that are arranged to abut each other.

As seen in Figures 11 and 14, Saunders et al. teaches a threaded tool joint for a rotary oil well tool that has a tapered thread.

In column 1, lines 11-17, Puttmann (US 5,924,500) teaches drill rods used in rotary or rotary/percussion drilling therefore teaching that drill rods are interchangeable between rotary and percussion drilling operations.

It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have tapered the thread of Jansson et al. as taught by Saunders et al. and Puttmann in order to have provided a tool joint for rotary or percussion drilling that resulted in lower local stresses and reduced the susceptibility to fatigue failure (see col. 1, lines 63-66 of Saunders et al.).

As seen in Figure 1 and 3, Eklof et al. teaches a threaded connection for a percussion rock drill. The threaded connection includes conical male threads (13) located on a first drill string element (10) and conical female threads (12) located on a second drill string element (11). The first element includes a first impact surface (16) and the second element includes a second impact surface (15). It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have included the first and second impact surfaces taught by Eklof et al. on the threaded connector of Larsson in order to have provided a means for limiting the degree to which the two elements were threaded together, i.e. to have ensured that the threads of the two elements were completely in contact.

11. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larsson (US 4,861,209) in view of Saunders et al. (US 4,549,754), Puttmann (US 5,924,500), and Eklof et al. (US 4,687,368) as applied to claim 1 above, and further in view of Yao (US 6,196,598).

Larsson, Saunders et al., Puttmann, and Eklof et al. disclose all of the limitations of the above claims except for the angle of the cone formed by the male and female threads being less than 20°, specifically 3°. Yao teaches a threaded coupling for a drill string used in rotary or

percussive drilling. The threads of the coupling are conical in shape and have a cone angle of between 3° and 10°. (See col. 4, lines 13-29) It would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have formed the cone formed by the male and female threads of Larsson in view of Saunders et al., Puttmann, and Eklof et al. with an angle less than 20°, specifically 3° as taught by Yao in order to have ensured optimum stress mitigation (see col. 4, lines 25-29)

Response to Arguments

12. Applicant's arguments filed 09 June 2003 have been fully considered but they are not persuasive.

In response to applicant's argument that the examiner did not address the previous argument emphasizing the basic difference between percussive and rotary drilling and why one skilled in the percussive drilling art would not look to the rotary drilling art for guidance, the examiner notes that this argument was addressed in the pervious Office Action. Specifically, the examiner noted that "percussive rock drilling" was only recited in the preamble of the claim thus not given patentable weight and that she considered drill strings for rotary and percussive drilling to be interchangeable. In further response to this argument, the examiner has provided several references that teach that a drill string or drilling rods can be used for rotary **and/or** percussive drilling; in the Abstract of Jansson (US 4,770,259) it is taught that a drill tool, that includes a drill string, can be used in rotary and/or percussion drilling and in column 1, lines 11-17, Puttmann (US 5,924,500) teaches drill rods used in rotary or rotary/percussion drilling.

In response to applicant's argument that Saunders and Larsson or Jansson et al. can not be combined because Saunders is drawn toward rotary drilling and the others are drawn toward percussive drilling, the examiner refers applicant to the response above.

In response to applicant's argument that the examiner must give weight to "percussive rock drilling" in the preamble of the claim because the claims recites a first and second impact surface that are arranged to abut against each other, the examiner disagrees. It is the opinion of the examiner that these features are not indicative of percussion drilling and that "percussive rock drilling" does not breath life and meaning into the overall claim. Further, all of the

references relied upon do teach percussive drilling except for Saunders. However, in light of applicant's argument, a new rejection has been presented where all of the references are drawn toward percussive drilling.

In response to applicant's argument that column 1, lines 63-66 of Saunders is not motivation to combine the reference with Larsson or Jansson et al., the examiner disagrees. This is the motivation provided by Saunders to form the threaded coupling with conical threads.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer H Gay whose telephone number is (703) 308-2881. The examiner can normally be reached on Monday-Thursday, 6:30-4:00 and Friday, 6:30-1:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on (703) 308-2151. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7687 for regular communications and (703) 305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.

David Bagnell
Supervisory Patent Examiner
Art Unit 3672

JHG
June 24, 2003